

Palaeoclimate Reconstruction of the Late Quaternary and Evolution of Aeolian Sand Encroachments in the Northwestern Negev Desert

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Abstract

Sand dunes are sensitive to climate change. In the past, incursions of aeolian sand have mostly been attributed to reduction in rainfall and aridification. We hypothesize that wind intensity and direction is no less influential on sand mobility than rainfall. Our goal is to test this hypothesis by developing a model of the conditions in which the Negev dunes were active or stabilized. Developing such a model is possible because past climates that were responsible for the mobilization and stabilization of dune fields are reconstructible. The planned research requires a multidisciplinary approach and substantial funding. Here, we propose a feasibility study to carry out preliminary research essential for developing a full-fledged proposal for NSF or other governmental and international agencies.

In this proposal, we request funding for reconnaissance ground penetrating radar (GPR) work needed for initial stratigraphic reconstruction. Ben Gurion University will assist with remote sensing analysis of the area accompanied by fieldwork, and Hebrew University of Jerusalem will provide chronological analysis of periods of incursions. Results will provide both globally important information on the relative importance of wind and rainfall on sand mobility, and locally important information that will facilitate the understanding of the palaeoclimate, rainfall pattern and wind regime that formed the sand dunes in the Negev. This will enable us to estimate the response of the Negev sand field to future climate change.